

Financial Integration and Risk Sharing: The Role of the Monetary Union

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Motivation

1. Financial integration is of utmost importance for the euro area:

- Transmission of single monetary policy
- Smooth operation of payment systems
- Financial stability

2. Financial integration has real effects on the economy:

- Economic growth
- Business cycles
- Volatility of output and consumption
- Risk sharing

3. Important for policy makers and for central bankers:

- Volatility and synchronization of business cycles are central to monetary policy
- Risk sharing is central for the optimality of a currency area

Outline

First Part: The Euro and Financial Integration

1. State of financial integration in the euro area
2. Impact of the Euro and harmonization policies in the financial sector (FSAP) on banking integration

Second Part: The Real Effects of Financial integration

3. Banking integration and business cycle synchronization
4. Banking integration and macroeconomic volatility
5. Banking integration and cross-country risk sharing

Summary and policy implications

Overview of Financial Integration Across Market Segments in the Euro Area

Market	State of integration	Policy initiatives
Money markets		
Unsecured/secured money market	Very high	TARGET / TARGET2
Commercial paper	Low	STEP
Bond markets		
Government bond markets	High	
Corporate bond markets	Fair	TARGET2-Securities
Equity markets	Low	TARGET2-Securities
Banking markets		Banking directives, FSAP
Wholesale activities	Advanced	TARGET / TARGET2
Retail banking	Very low	SEPA

Source: Special edition of the ECB Monthly Bulletin (May 2008)

Our Focus: Banking Integration

- Banks are the key financial intermediaries.
- Most euro area member countries' financial systems are “bank-based”
- Bank assets have reached unprecedented levels over the past decade.
- Strong correlation with other types of capital flows
 - (Lane and Milesi-Ferretti, 2006)

Data

BIS panel dataset between 1978-2007 on external bank assets and liabilities both for each country (aggregate) and per pair of countries (bilateral)

- All international on balance sheet exposure of the banking sector across all sectors (banking and non-banking) plus some off-balance sheet items
- Mostly wholesale bank activity

20 high-income countries:

- 12 initial euro area countries
- 3 non-euro EU countries: GBR, DNK and SWE
- 5 high income countries (control group): AUS, CAN, CHE, JPN, USA

Specification: Euro and Banking Integration

Difference-in-difference specification

$$BANKINT_{i,j,t} = \alpha_{i,j} + \alpha_t + \beta_1 EZ2_{i,j,t} + \beta_2 EZ1_{i,j,t} + \beta_3 EU2_{i,j,t} + \beta_4 EU1_{i,j,t} + \gamma FSAP_{i,j,t} + \varepsilon_{i,j,t}$$

BANKINT: Bilateral (time-varying) cross-border bank stocks-flows. (using BIS data)

EZ2 (EU2): Indicator (dummy) variables that equal one in the year that both counterparts join the euro zone (or the EU).

EZ1 (EU1): Indicator (dummy) variables that equal one if only one of the two countries is a member of the euro zone (or the EU). [account for unilateral effects of euro area or EU membership]

FSAP: Bilateral measure of the harmonization of financial policies using EU Commission data on the transposition of the directives of the Financial Service Action Plan, launched in 1999

The Euro and Bilateral Banking Integration

	Banking Integration Index based on Bilateral Stocks			
	All countries		EU15	
	(1)	(2)	(3)	(4)
Euro area both (EZ2)	0.39	0.39	0.48	0.37
t-stat	4.03	3.94	2.06	2.50
Euro area one (EZ1)	-0.09	-0.09	-0.46	-0.55
t-stat	-0.71	-0.70	-0.91	-1.39
EU both (EU2)	-0.06	-0.06	—	—
t-stat	-0.65	-0.64		
EU one (EU1)	-0.30	-0.30	—	—
t-stat	-1.91	-1.87		
Country-pair FE and Year FE	Yes	Yes	Yes	Yes
Country-specific time trends	No	Yes	No	Yes
Observations	4188	4188	2312	2312
Country-pairs	189	189	105	105

Increase in
bilateral stocks
of 44%.

Financial Sector Harmonization and Bilateral Banking Integration

	Banking Integration Index based on Bilateral Stocks			
	(1)	(2)	(3)	(4)
FSAP Both	0.08	0.05	0.05	0.05
t-stat	2.84	2.37	7.23	3.45
Euro area both (EZ2)	—	—	0.50	0.33
t-stat			2.58	3.50
Euro area one (EZ1)	—	—	0.06	-0.09
t-stat			0.36	-0.76
EU both (EU2)	—	—	-0.18	-0.05
t-stat			-0.98	-0.55
EU one (EU1)	—	—	-0.59	-0.28
t-stat			-3.30	-1.81
Country-pair FE and Year FE	Yes	Yes	Yes	Yes
Country-specific time trends	No	Yes	No	Yes
Observations	4188	4188	4188	4188

The Real Effects of Financial Integration

1. Business cycle synchronization and banking integration
2. Business cycle volatility and banking integration
3. Risk sharing and banking integration

Brief Summary: Theoretical Literature

- Consumers insure against idiosyncratic country risk via global capital markets
 - (Obstfeld, 1994; Lewis, 1996; Sorensen and Yosha, 1998)
- Diversification across borders shifts investment towards high return sectors, inducing specialization
 - (Helpman and Razin, 1978; Obstfeld, 1994)
- Financial integration amplifies GDP differences as capital flows to countries with high productivity and workers substitute leisure with labour
 - (Backus, Kehoe, and Kydland, 1992; Baxter and Crucini, 1995)
- Corporate finance models: focus on banking, yield similar predictions, although the effect could differ depending on the nature of shocks
 - (Holmstrom and Tirole, 1997; Morgan, Rime, Strahan, 2004; Allen and Gale, 2000)
- International diversification is more appealing in regions-countries with less correlated returns and thus less synchronized GDP growth rates
 - (Heathcote and Perri, 2008)

“Standard” Theoretical Predictions

A higher degree of financial integration:

- 1. Less synchronized, more divergent business (GDP) cycles**
- 2. Higher output volatility**
- 3. But, lower consumption volatility (due to risk sharing and consumption smoothing).**

Brief Summary: Empirical Literature

1. Financial integration and business cycle synchronization:

- Cross-country: positive relationship between integration and synchronization
— (Imbs, 2004, 2006)
- Panel (US states): banking integration lead to more synchronized state cycles
— (Morgan, Rime, and Strahan, 2004)
- Studies (focus on within federations): a negative relationship between financial integration and synchronization via the specialization channel
— (Kalemli-Ozcan, Sorensen, Yosha, 2001, 2003)

2. Financial integration and macroeconomic volatility:

- Cross-country: Weak and inconclusive (Kose, Prasad, Terrones, 2006)
- Panel (US states): banking integration lead to lower state output volatility
— (Morgan, Rime, Strahan, 2004)

3. Financial integration and risk sharing:

- A higher level of foreign assets and liabilities increases income and consumption risk sharing (Sorensen, *et al.*, 2007; Fratzscher and Imbs, 2007)
- Increase in consumption risk sharing in the Euro area since the 1990s
— (Giannone and Reichlin, 2006)
- Some increase in income risk sharing via bank M&A since the 1990s
— (Demyanyk, Ostergaard, Sorensen, 2008)

Banking Integration and Business Cycle Synchronization: Specification

$$SYNCH_{i,j,t} = \alpha_{i,j} + \alpha_t + \beta BANKINT_{i,j,t-1} + CONTROLS_{i,j,t-1} + \varepsilon_{i,j,t}$$

$$\text{where } SYNCH1_{i,j,t} = -\left| \ln(GDP_{i,t}/GDP_{i,t-1}) - \ln(GDP_{j,t}/GDP_{j,t-1}) \right|$$

$$\text{and } SYNCH2_{i,j,t} = \text{corr}(\text{cyclical component of } GDP)$$

Merits of panel estimation:

1. Country-pair fixed-effects control for sources of time-invariant bilateral characteristics
 - Distance, political ties, legal system similarities, cultural ties...
 - Previous research shows these affect both business cycles and integration
2. Year (period) fixed-effects accounts for global trends
 - Business cycle patterns (may) have changed and integration has increased

Banking Integration and Synchronization: Panel results (annual and five-year frequency) ➔ Higher integration leads to less synchronized cycles

	Banking Integration Index based on Stocks			
	Annual Data		5-year Averaged Data	
	Between	Within	Between	Within
	(1)	(2)	(3)	(4)
Banking Integration	0.03	-0.25	0.02	-0.09
t-stat	0.68	5.37	3.02	3.88
Period FE	No	Yes	No	Yes
Country-pair FE	No	Yes	No	Yes
Observations	4188	4188	953	953
Country-pairs	189	189	189	189

Banking Integration and Macroeconomic Volatility: Specification

$$FLUCT_{i,t}^{GDP,C} = \alpha_i + \alpha_t + \beta BANKINT_{i,t-1} + CONTROLS_{i,t-1} + \varepsilon_{i,t}$$

- Are increases in the degree of financial integration associated with higher or lower consumption and output fluctuations?
- Panel: control for global trends, country-specific unobservable characteristics.
- Use both annual data and non-overlapping 5-year periods.
- Two measures:
 - *FLUCT1*: Deviation of output and consumption growth from global and country mean (Morgan, Rime, Strahan, 2004)
 - *FLUCT2*: Standard deviation of output and consumption growth over each 5-year period.

Banking Integration and GDP Fluctuations

➔ Higher output volatility due to high external liabilities

	Banking Integration Index based on Flows			
	Annual Data		5-year Averaged	
	(1)	(2)	(3)	(4)
Banking Integration - Aggregate t-stat	0.01 <u>1.71</u>		0.00 <u>0.66</u>	➔ Weak effect of aggregate index
Banking Integration - Assets t-stat		0.00 -0.51		-0.01 -1.24
Banking Integration - Liabilities t-stat		0.01 2.51		0.02 2.27
Period FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	574	574	119	119
Countries	20	20	20	20

Banking Integration and Consumption Fluctuations

➔ Lower consumption volatility due to high external assets

	Banking Integration Index based on Flows			
	Annual Data		5-Year Averaged Data	
	(1)	(2)	(3)	(4)
Banking Integration - Aggregate t-stat	0.00 <u>-1.92</u>		0.00 <u>-1.24</u>	→ Weak effect of aggregate index
Banking Integration - Assets t-stat		-0.01 -2.08		-0.02 -2.93
Banking Integration - Liabilities t-stat		0.00 0.95		0.01 1.19
Period FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	574	574	119	119
Countries	20	20	20	20

Robustness (in both synchronization and volatility specifications)

- Control for trade (Frankel and Rose, 1998)
- Control for industrial specialization (Krugman, 1991)
- Control for financial development
- Alternative measures for business cycle synchronization and volatility
- Alternative measures of banking integration

Banking Integration and Risk Sharing Specification

The result that banking integration (external assets) is negatively correlated with consumption volatility suggests that banking integration improves risk sharing

We ask: *How much?*

$$1^{\text{st}} \text{ model: } (\Delta \log C_{i,t} - \Delta \log C_t) = \mu_i + \kappa (\Delta \log GDP_{i,t} - \Delta \log GDP_t) + \varepsilon_{i,t}$$

$$2^{\text{nd}} \text{ model: } (\Delta \log GNI_{i,t} - \Delta \log GNI_t) = \mu_i + \kappa (\Delta \log GDP_{i,t} - \Delta \log GDP_t) + \varepsilon_{i,t}$$

where

$$\kappa = \kappa_0 + \kappa_1 \left(t - \bar{t} \right) + \kappa_2^{\text{Assets}} (BANKINT_{i,t-1} - BANKINT_{t-1}) + \kappa_2^{\text{Liab}} (BANKINT_{i,t-1} - BANKINT_{t-1})$$

Following Kalemli-Ozcan, *et al.* (2003); Melitz & Zumer (1999); Sorensen *et al.* (2007)

Banking Integration and Consumption Risk Sharing

➔ 14% additional RS by doubling external assets

Dep. Variable: Idiosyncratic Consumption Growth	Total (1)	Household (2)
Idiosyncratic GDP growth	0.62	0.66
t-stat	21.51	21.30
Idiosyncratic GDP growth x Banking Integration-Assets	-0.17	-0.14
t-stat	-3.00	-2.00
Idiosyncratic GDP growth x Banking Integration-Liabilities	0.08	0.07
t-stat	1.61	1.52
Idiosyncratic GDP growth x Trend	-0.01	-0.01
t-stat	-2.74	-3.05
Country FE	Yes	Yes
Observations	574	574
Countries	20	20

Banking Integration and Income Risk Sharing

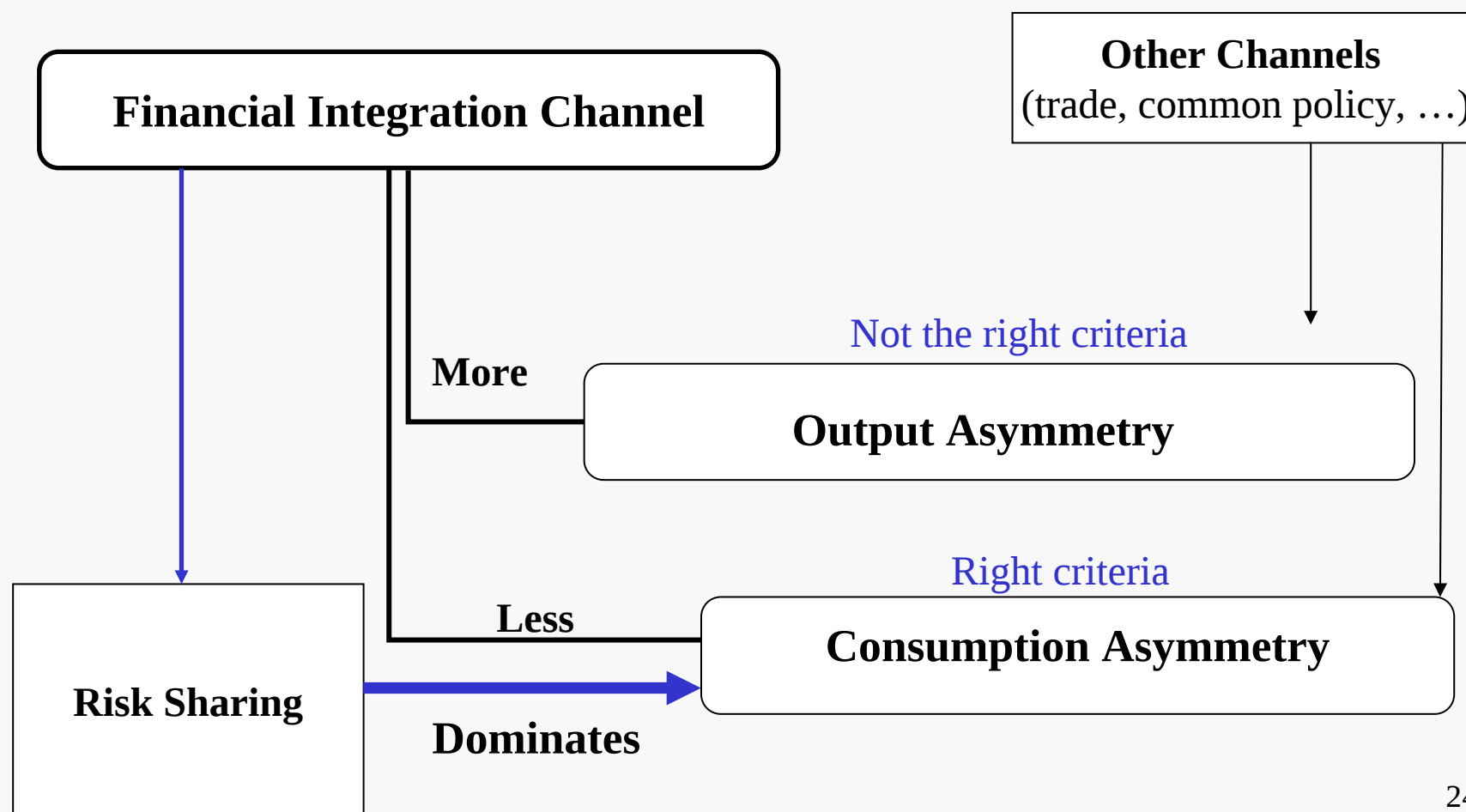
➔ 18% additional RS by doubling external liabilities

Dep. Variable: Idiosyncratic Income (GNI) growth	
Idiosyncratic GDP growth	0.88
t-stat	2.76
Idiosyncratic GDP growth x Banking Integration-Assets	0.08
t-stat	1.10
Idiosyncratic GDP growth x Banking Integration-Liabilities	-0.18
t-stat	-3.52
Idiosyncratic GDP growth x Trend	-0.02
t-stat	-1.91
Country FE	Yes
Observations	574
Countries	20

Summary

1. The euro has spurred cross-border bilateral banking integration
 - Monetary union
 - Legal-regulatory financial sector harmonization
2. In line with standard theory, country-pair banking integration is associated with less synchronized, more divergent cycles
3. Country level banking integration (external liabilities) has increased the volatility of GDP growth
4. Country level banking integration (in form of external assets) has reduced the volatility of consumption growth
5. Country level banking integration has increased consumption and income risk sharing

Policy Implications: RS increases ex-post optimality of the currency area



Policy implications:

RS increases ex-post optimality of the currency area

- Countries might decide to specialize in high-return sectors or invest in relatively high potential regions because they spread the risk of production in EU-wide capital markets due to financial integration
- This might increase the asymmetry and variability of output.
- But it should reduce the consumption fluctuations
- To the extent that risk-sharing allows consumption smoothing, it represents a key counteracting mechanism against output asymmetries
- This mechanism reduces the need for policy intervention in dealing with such asymmetries

Synthesizing our (five) empirical results

- ➔ The increased cross-border banking integration — due to the euro — has improved ex-post the optimality of the currency union by improving consumption and income risk sharing